CLAIMS

What is claimed is:

5 1.   A method for extracting a set of key-frames from
a video, comprising the steps of:
        selecting a set of candidate key-frames from
among a series of video frames in the video by
performing a set of analyses on each video frame,
10 each analysis selected to detect a meaningful content
in the video;
        arranging the candidate key-frames into a set of
clusters;
        selecting one of the candidate key-frames from
15 each cluster in response to a relative importance of
each candidate key-frame.

2.   The method of claim 1, wherein the step of
selecting a set of candidate key-frames includes the
20 step of selecting a set of candidate key-frames in
response to a camera motion in the video.

3.   The method of claim 1, wherein the step of
selecting a set of candidate key-frames includes the
25 step of selecting a set of candidate key-frames in
response to an object motion in the video.

4.   The method of claim 1, wherein the step of
selecting a set of candidate key-frames includes the
30 step of selecting a set of candidate key-frames in
response to a fast camera movement in the video.

5.   The method of claim 1, wherein the step of

selecting a set of candidate key-frames includes the step of selecting a set of candidate key-frames in response to a human face content in the video.

5   6.   The method of claim 1, further comprising the step of selecting a set of candidate key-frames in response to an audio event in the video.

7.   The method of claim 1, wherein the step of
10   selecting one of the key-frames from each cluster includes the step of determining an importance score for each candidate key-frame.

8.   The method of claim 7, wherein the step of
15   determining an importance score for each candidate key-frame includes the step of determining an importance score in response to the meaningful content in each candidate key-frame.

20   9.   The method of claim 1, wherein the step of selecting one of the key-frames from each cluster includes the step of selecting one of the key-frames in response to an image quality of each candidate key-frame.
25

10.   The method of claim 1, further comprising the step of selecting multiple key-frames from each cluster and obtaining a user selection for the multiple key-frames.
30

11.   The method of claim 1, wherein the analyses include an accumulative color histogram difference comparison of the video frames.

Attorney Docket No.: 200300641

12. The method of claim 1, wherein the analyses include an accumulative color layout difference comparison of the video frames.

5

13. The method of claim 1, further comprising the step of obtaining a user selection from among a set of video frames in the video previous to each key-frame and a set of video frames in the video

10 subsequent to each key-frame.

14. A key-frame extraction system, comprising:
     a set of frame analyzers that each select a set of candidate key-frames from among a series of video

15 frames in a video, each frame analyzers for detecting a meaningful content in the video;
     key-frame selector that arranges the candidate key-frames into a set of clusters and that selects one of the candidate key-frames from each cluster as

20 a key-frame for the video in response to a relative importance of each candidate key-frame.

15. The key-frame extraction system of claim 14, further comprising an audio event detector that

25 selects a set of candidate key-frames by detecting a set of audio events in the video.

16. The key-frame extraction system of claim 14, wherein the frame analyzers include a color histogram

30 analyzer.

17. The key-frame extraction system of claim 14, wherein the frame analyzers include a color layout

analyzer.

18. The key-frame extraction system of claim 14, wherein the frame analyzers include a fast camera motion detector.

19. The key-frame extraction system of claim 14, wherein the frame analyzers include a camera motion tracker.

20. The key-frame extraction system of claim 14, wherein the frame analyzers include an object motion analyzer.

21. The key-frame extraction system of claim 14, wherein the frame analyzers include a human face detector.

22. The key-frame extraction system of claim 14, further comprising a user interface for displaying a set of video frames in the video previous to each key-frame and a set of video frames in the video subsequent to each key-frame and for obtaining a user selection of one or more of the video frames.

Attorney Docket No.: 200300641